

Applicant: Jorma Haag et al.  
PCT App. No.: PCT/FI03/00452

### **Claim Listing**

1-8. (cancelled)

9. (new) A relief cylinder structure for guiding a roll in a multinip calender, said relief cylinder structure comprising:

a frame;

an arm arranged to move linearly in relation to the frame, a main cylinder area being defined between the arm and the frame;

portions of the arm which define a quick-opening cylinder within the arm, the quick-opening cylinder being in communication with the main cylinder area; and

a fluid coupling in communication with the quick-opening cylinder such that fluid within the quick-opening cylinder may be discharged from the quick-opening cylinder thereby drawing fluid within the main cylinder area into the quick-opening cylinder and causing the arm to move within the frame.

10. (new) The relief cylinder structure of claim 9 wherein an auxiliary piston is arranged to move linearly in the quick-opening cylinder, in parallel to the arm and the frame.

11. (new) The relief cylinder structure of claim 9 wherein the volume of the quick-opening cylinder is at its largest when the total length of the relief cylinder structure is at its longest.

12. (new) The relief cylinder structure of claim 9 wherein the volume of the quick-opening cylinder is at its smallest when the total length of the relief cylinder structure is at its shortest.

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13. (new) The relief cylinder structure of claim 9 wherein the main fluid coupling is placed substantially at a first end of the frame, and the auxiliary fluid coupling is placed substantially at a first end of the arm.

14. (new) A relief cylinder structure for guiding a roll in a multiplex calender, the relief cylinder structure comprising:

a frame having a main cylinder therewithin;

a piston-like arm arranged to move within the main cylinder of the frame;

a main fluid coupling in the frame which communicates with the main cylinder of the frame;

portions of the piston-like arm which define a quick-opening cylinder arranged inside the arm;

an auxiliary piston arranged to move within the quick-opening cylinder; and

an auxiliary fluid coupling formed by portions of the arm which communicates with the quick-opening cylinder, wherein in a normal operating position pressure is supplied through the auxiliary fluid coupling to the quick-opening cylinder and through the main fluid coupling to the main cylinder, both said supplied pressures acting upon the auxiliary piston, and wherein in a fault situation, the auxiliary fluid coupling is arranged to be open, wherein the pressure produced in the quick-opening cylinder is discharged to a fluid system via the auxiliary fluid coupling, said fluid system being arranged in a substantially non-pressurized state, as a result of opening the auxiliary coupling, the pressure of the quick-opening cylinder is reduced below the pressure of the main cylinder, wherein the auxiliary piston moves within the quick-opening cylinder to increase the volume of the quick-opening cylinder in communication with the main cylinder, such that the piston-like arm is retracted within the frame reducing the length of the relief cylinder.

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15. (new) The structure of claim 14 wherein the auxiliary piston is arranged to move linearly in the quick-opening cylinder, in parallel to the arm and the frame.

16. (new) A relief cylinder structure for guiding a roll in a multinip calender, said relief cylinder structure comprising:

- a frame having portions defining an interior volume;
- an arm arranged to move linearly in relation to the frame, and having portions which extend into the frame interior volume to define a main cylinder area between the arm and the frame;
- a main fluid coupling which is in communication with the main cylinder area, wherein introduction of fluid through the main fluid coupling into the main cylinder area causes the arm to move in the frame;
- portions of the arm which define a quick-opening cylinder interior volume;
- an auxiliary fluid coupling which is in communication with the quick-opening cylinder interior volume; and
- an auxiliary piston which is movable within the quick-opening cylinder interior volume, the auxiliary piston dividing the quick-opening cylinder interior volume into two portions which are sealed from one another by the auxiliary piston, a first volume which is in communication with the auxiliary fluid coupling, and a second volume which is in communication with the main cylinder area, the sizes of the first volume and the second volume being variable with the movement of the auxiliary piston.

17. (new) The relief cylinder structure of claim 16 wherein the auxiliary piston is arranged to move linearly in the quick-opening cylinder interior volume, in parallel to the arm and the frame.

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18. (new) The relief cylinder structure of claim 16 wherein the main fluid coupling is placed substantially at a first end of the frame, and the auxiliary fluid coupling is placed substantially at a first end of the arm.

19. (new) The relief cylinder structure for guiding a roll in a multinip calender of claim 16 further comprising a second relief cylinder structure within the same multinip calender, wherein the second relief cylinder structure has a second auxiliary piston of a length different than the other relief cylinder structure auxiliary piston.